

PATENT ABSTRACTS OF JAPAN

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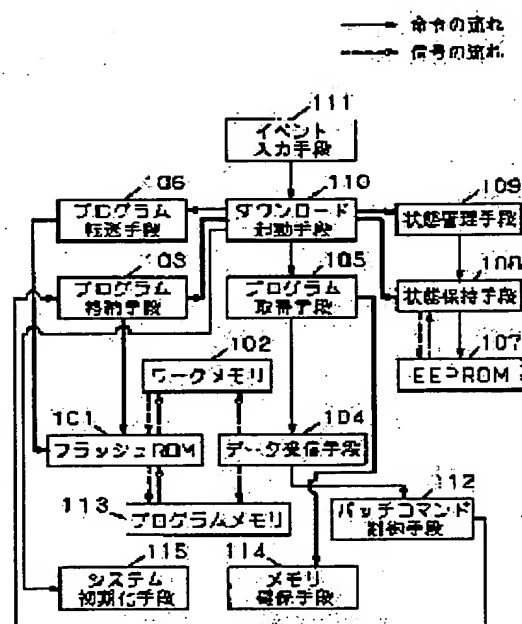
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(54) REMOTE PROGRAM DOWN-LOADING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a remote program down-loading device unnecessitating an excess down-loading processing area by temporarily placing a down-loading processing program area through the effective use of a non-down-loading processing program area which is not required to operate during down-loading.

SOLUTION: A down-load starting means 110 down-loads a program to be down-loaded, which is specified by a state managing means 109, and a program transferring means 106 transfers the down-loaded program.



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JP, 2000-047877, A [CLAIMS]

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CLAIMS

[Claim(s)]

[Claim 1] With the directions from an operator, the download processing program first transmitted from the transmitting-side system is downloaded to nonvolatile memory. Next, this download processing program is transmitted to the download processing program field on non-volatilized system memory. Finally programs other than download processing are downloaded from a transmitting-side system using this download processing program. When a patch command is transmitted from a transmitting-side system, execute this patch command and partial rewriting of a program is performed. Remote program download equipment characterized by securing program memory to work-piece memory when the work-piece memory used for download runs short.

[Claim 2] A program storing means to store in nonvolatile memory, such as a flash ROM, in the format that a program can be performed, A data receiving means to receive the data packet transmitted from the transmitter of a transmitting-side system through a digital transmission way, Program management information, such as arrangement address information of the program which interpreted this data packet and had the specified program classification, and size information, and a program acquisition means to read the program body into work-piece memory, A program transfer means to transmit a program based on program management information, A condition maintenance means to use nonvolatile memory, such as EEPROM, and to hold the condition under download processing of a program, It manages which program classification a program with is downloaded in the three condition under download processing which a condition maintenance means holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means required for download processing, data receiving means, and program acquisition means of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading processing program, The condition that a condition maintenance means holds is made into the 1st condition under download processing at the time of activate request reception. The program acquisition means realized with a download processing program when there is a program which the status management means specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into work-piece memory. Start a program storing means, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means and was downloaded last time A download starting means to shift [in the case of the 1st condition] to the 3rd condition in the case of the 2nd condition and the 2nd condition, and to complete the condition under download processing after storing processing ending in the 3rd condition, An event input means to detect the program download demand from an operator through input devices, such as remote control, and to perform an activate request to a download starting means, A patch command control means to interpret this patch command and to perform partial rewriting control of a program when the data packet which the data receiving means received is a data packet for patch commands, A memory secured means to secure program memory

required for actuation of a program compulsorily to work-piece memory when work-piece memory runs short, Remote program download equipment equipped with a system initialization means to initialize a receiving system after a program storing means stores the program which secured and read work-piece memory compulsorily.

[Claim 3] Remote program download equipment according to claim 1 characterized by diverting the frame buffer for display monitors which a receiving system has to work-piece memory.

[Claim 4] Remote program download equipment [equipped with a memory diversion means to divert the frame buffer for display monitors which a receiving system has to work-piece memory instead of a memory secured means] according to claim 2.

[Claim 5] Remote program download equipment according to claim 1 characterized by securing work-piece memory from the variable region in program memory at the time of system initialization when it is in a work-piece condition out of memory.

[Claim 6] Remote program download equipment according to claim 2 which started the condition maintenance means, considered as the work-piece condition out of memory when work-piece memory ran short, and was equipped with a memory management means to secure work-piece memory from the variable region in program memory when it is in a work-piece condition out of memory, at the time of system initialization.

[Claim 7] Remote program download equipment according to claim 5 characterized by storing a patch command in nonvolatile memory at the time of reception, and executing this patch command at the time of a system startup.

[Claim 8] Remote program download equipment [equipped with a delay activation means to store a patch command in nonvolatile memory and to start a condition maintenance means when delay run designation has the received patch command, to consider as a patch command delay running state, and to start a patch command control means at the time of system initialization when it is a delay running state] according to claim 6.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the remote program download equipment (International Patent Classification G06F 9/455) which performs software version up of the product connected to the network through a digital transmission way by RIMOTO.

[0002]

[Description of the Prior Art] In recent years, also in the so-called embedded-type microcomputer control system which has arranged the program code to ROM, increase-ization of a program size is advancing with complication of an object system, and the maintenance of the software after shipment of the product adapting this poses an important problem.

[0003] Since this problem is solved, software may be maintained by downloading a program through a transmission line about the product equipped with the digital transmission way of wireless/cables, such as a digital satellite broadcasting service receiver and a digital CATV broadcast receiver, in such products to which it included and the mold microcomputer control system was applied. Moreover, about the configuration of conventional remote software download equipment, it is explained by the remote software download approach of JP,5-158703,A, and realizes with the configuration as shown in drawing 7.

[0004] drawing 7 -- setting -- 701 -- present -- nonvolatile memory, such as a flash ROM business and for reserves, -- A program storing means by which 702 stores work-piece memory, such as DRAM, and 703 in nonvolatile memory 701 in the format that a program can be performed, A data receiving means to receive the data packet to which 704 is transmitted from the transmitter of a transmitting-side system through a digital transmission way, A program acquisition means for 705 to interpret this data packet and to read the program management information and the program bodies of a program, such as arrangement address information and size information, into the work-piece memory 702, 706 starts the program acquisition means 705 and reads a program into the work-piece memory 702. A download starting means to start the program storing means 703, to store this program, and to complete download, 707 is an event input means to detect the program download demand from an operator through input devices, such as remote control, and to perform an activate request to the download starting means 706.

[0005] About the conventional remote program download equipment constituted as mentioned above, the actuation is explained below. If remote control is pushed and an operator performs download directions of a program, the event input means 707 will detect a program download demand, and will perform an activate request to the download starting means 706.

[0006] Next, the download starting means 706 starts the program acquisition means 705, and the program acquisition means 705 extracts a program packet out of a data packet using the data receiving means 704, and reads a program packet into the work-piece memory 702.

[0007] Next, the download starting means 706 starts the program storing means 703, and stores the program body in nonvolatile memory 701 based on the address information in a program packet, and size information. However, since nonvolatile memory is destroyed at the time of generating of various failures, such as power off under download processing, and a system stops working, it has spare nonvolatile memory, and at the time of failure generating, it is devised so

that a system may be worked by spare nonvolatile memory.

[0008]

[Problem(s) to be Solved by the Invention] However, in the conventional remote program download equipment constituted as mentioned above, the nonvolatile memory for reserves was needed and it had the trouble that the cost of a product became high. Especially, this poses a big problem, when like [public welfare home electronics like a digital satellite broadcasting service receiver].

[0009] in order [moreover,] to make this problem small -- present -- the nonvolatile memory of business is constituted for the rewritable nonvolatile memory of a flash ROM etc., and the nonvolatile memory for reserves from nonvolatile memory of a mask ROM etc. which is not rewritable, and although how to press down the cost rise of the nonvolatile memory for reserves can be considered, since the maintenance of the program stored in the nonvolatile memory for reserves is impossible, by this approach, it does not become solution of a fundamental problem.

[0010] Furthermore, although how to make size of the nonvolatile memory for reserves small, and to press down the cost rise of the nonvolatile memory for reserves by storing in the nonvolatile memory for reserves the program in which only download processing is possible can be considered, when the specific gravity of the program for being **** is large, it does not become the solution in question in this case, for example about download processing like a digital satellite broadcasting service receiver, either.

[0011]

[Means for Solving the Problem] In order to solve said technical problem, the remote program download equipment of this invention is characterized by for a download starting means starting a download processing program, and downloading the program which should be downloaded according to the condition that a status management means specifies, or starting a program transfer means, and transmitting a program.

[0012] This invention aims at providing remote program download equipment strong against a failure by the low cost which does not need the excessive download processing field of a sake when the program field for download processing is destroyed by utilizing during download a non-downloading processing program field without the need of operating, placing a download processing program temporarily, and moreover managing the various conditions under download processing strictly by this configuration.

[0013]

[Embodiment of the Invention] Invention of this invention according to claim 1 downloads a download processing program first with the directions from an operator. Next, this download processing program is transmitted to a download processing program field. By being characterized by finally downloading programs other than download processing using this download processing program, and managing the program in which download processing is always possible Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, it has an operation of making it possible to perform download processing, by securing program memory to work-piece memory.

[0014] A program storing means to store invention of this invention according to claim 2 in nonvolatile memory, such as a flash ROM, in the format that a program can be performed, next, A data receiving means to receive the data packet transmitted from the transmitter of a transmitting-side system through a digital transmission way, Program management information, such as arrangement address information of the program which interpreted this data packet and had the specified program classification, and size information, and a program acquisition means to read the program body into work-piece memory, A program transfer means to transmit a program based on program management information, A condition maintenance means to use nonvolatile memory, such as EEPROM, and to hold the condition under download processing of a program, It manages which program classification a program with is downloaded in the three

condition under download processing which a condition maintenance means holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means required for download processing, data receiving means, and program acquisition means of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading processing program, The condition that a condition maintenance means holds is made into the 1st condition under download processing at the time of activate request reception. The program acquisition means realized with a download processing program when there is a program which the status management means specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into work-piece memory. Start a program storing means, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means and was downloaded last time A download starting means to shift [in the case of the 1st condition] to the 3rd condition in the case of the 2nd condition and the 2nd condition, and to complete the condition under download processing after storing processing ending in the 3rd condition, An event input means to detect the program download demand from an operator through input devices, such as remote control, and to perform an activate request to a download starting means, A patch command control means to interpret this patch command and to perform partial rewriting control of a program when the data packet which the data receiving means received is a data packet for patch commands, A memory secured means to secure program memory required for actuation of a program compulsorily to work-piece memory when work-piece memory runs short, It has a system initialization means to initialize a receiving system after a program storing means stores the program which secured and read work-piece memory compulsorily. By a download starting means' starting the active download processing program which a status management means specifies, and downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, and a memory secured means secures program memory to work-piece memory, it has an operation of making it possible to perform download processing.

[0015] In the remote software download equipment with which invention of this invention according to claim 3 was indicated by claim 1 By being characterized by diverting the frame buffer for display monitors which a receiving system has to work-piece memory, and managing the program in which download processing is always possible Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, it has an operation of making it possible to perform download processing, by diverting the frame buffer for display monitors which a receiving system has to work-piece memory.

[0016] In the remote software download equipment with which invention of this invention according to claim 4 was indicated by claim 2 below It has a memory diversion means to divert the frame buffer for display monitors which a receiving system has to work-piece memory instead of a memory secured means. By a download starting means' starting the active download processing program which a status management means specifies, and downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing

by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, and a memory diversion means diverts the frame buffer for display monitors which a receiving system has to work-piece memory, it has an operation of making it possible to perform download processing.

[0017] In the remote software download equipment with which invention of this invention according to claim 5 was indicated by claim 1 By being characterized by securing work-piece memory from the variable region in program memory at the time of system initialization, when it is in a work-piece condition out of memory, and managing the program in which download processing is always possible Even if failures, such as power off, occur and a working download processing-program field is destroyed during download-It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, a system is initialized, and it has an operation of making it possible to perform download processing, by securing work-piece memory from the variable region in program memory at the time of system initialization.

[0018] In the remote software download equipment with which invention of this invention according to claim 6 was indicated by claim 2 below When work-piece memory runs short, start a condition maintenance means and it considers as a work-piece condition out of memory. It is what is characterized by having a memory management means to secure work-piece memory from the variable region in program memory when it is in a work-piece condition out of memory, at the time of system initialization. By a download starting means' starting the active download processing program which a status management means specifies, and downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when work-piece memory runs short, start a condition maintenance means and it considers as a work-piece condition out of memory. When a memory management means is in a work-piece condition out of memory at the time of system initialization, it has an operation of making it possible to perform download processing, by securing work-piece memory from the variable region in program memory.

[0019] In the remote software download equipment with which invention of this invention according to claim 7 was indicated by claim 5 By storing a patch command in nonvolatile memory at the time of reception, being characterized by executing this patch command at the time of a system startup, and managing the program in which download processing is always possible Even if failures, such as power off, occur and a working download processing program field is destroyed during download It makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And a patch command is stored in nonvolatile memory at the time of reception, and it has an operation of making it possible to perform download processing, by executing this patch command at the time of a system startup.

[0020] In the remote software download equipment with which invention of this invention according to claim 8 was indicated by claim 6 below A patch command is stored in nonvolatile memory when delay run designation has the received patch command. It is what starts a condition maintenance means, considers as a patch command delay running state, and is characterized by having a delay activation means to start a patch command control means at the time of system initialization when it is a delay running state. By a download starting means' starting the active download processing program which a status management means specifies,

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and downloading or transmitting the program which a status management means specifies and which should be downloaded. Even if failures, such as power off, occur and a working download processing program field is destroyed during download, it makes it possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. Moreover, it makes it possible to be able to change difference by download of only a patch command, without downloading all the programs to download. And when delay run designation has the received patch command, a delay activation means stores a patch command in nonvolatile memory. A condition maintenance means is started, and it considers as a patch command delay running state, and has an operation of making it possible to perform download processing, by starting a patch command control means at the time of system initialization, when it is a delay running state.

[0021] (Gestalt 1 of operation) Below, the gestalt of implementation of invention indicated by claim 1 and claim 2 of this invention is explained using drawing 1, drawing 2, and drawing 3.

[0022] Drawing 1 is the block diagram of the equipment in the gestalt 1 of operation of this invention. In drawing 1 a flash ROM and 102 101 Work-piece memory, such as DRAM, A program storing means to store 103 in a flash ROM 101 in the format that a program can be performed, A data receiving means to receive the data packet to which 104 is transmitted from the transmitter of a transmitting-side system through a digital transmission way, A program acquisition means to read the program management information and the program bodies of the program which 105 interpreted this data packet and had the specified program classification, such as arrangement address information and size information, into the work-piece memory 102, A program transfer means by which 106 transmits a program based on program management information, A condition maintenance means for 107 to use EEPROM, and for 108 to use EEPROM 107, and to hold the condition under download processing of a program, Or [that 109 activates which download processing program in two or more download processing programs for realizing the program storing means 103 required for download processing, the data receiving means 104, and the program acquisition means 105 of a program], It manages which program classification a program with is downloaded in the three condition under download processing which the condition maintenance means 108 holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means 103 required for download processing, the data receiving means 104, and the program acquisition means 105 of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading processing program, 110 makes the condition that the condition maintenance means 108 holds the 1st condition under download processing, at the time of activate request reception. The program acquisition means realized with a download processing program when there is a program which the status management means 109 specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into the work-piece memory 102. Start the program storing means 103, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means 106 and was downloaded last time In the case of the 1st condition, in the case of the 2nd condition and the 2nd condition, it shifts to the 3rd condition. A download starting means to complete the condition under download processing after storing processing ending in the 3rd condition, 111 detects the program download demand from an operator through input devices, such as remote control. An event input means to perform an activate request to the download starting means 110, When the data packet which the data receiving means 104 received is a data packet for patch commands, 112 A patch command control means to interpret this patch command and to perform partial rewriting control of a program, The program memory which needs 113 for actuation of a program, a memory secured means by which 114 secures program memory 113 compulsorily to work-piece memory, 115 is a system initialization means to initialize a receiving system, after a program storing means stores the program which secured and read work-piece memory compulsorily. Although the means which carries out exclusion of the

contention of the various resources at the time of performing download processing is required during system operation in fact besides this, since it is not the chief aim of this invention, it omits.

[0023] About the equipment of the gestalt 1 of the operation constituted as mentioned above, the actuation is explained below. Drawing 2 is the explanatory view showing the example of data packet structure which flows a digital transmission way in case the remote program download equipment in the gestalt 1 of operation of this invention downloads a program, and drawing 3 is the explanatory view showing the allocation situation of the flash ROM 101 (capacity of 1 M byte) in each condition under download in case the remote program download equipment in the gestalt 1 of operation of this invention downloads a program.

[0024] As shown in drawing 3, for from 0h street to a FFFFh address, a flash ROM 101 is a boot processing program field (with the program which performs various kinds of initialization processings). A program field required in order to realize the download starting means 110, the condition maintenance means 108, and the status management means 109, From 10000h street to 5FFFFh addresses are download processing program fields (with a program required in order to realize the program storing means 103, the data receiving means 104, and the program acquisition means 105). A program field required in order to realize various kinds of functions of product original, such as a reception program of the digital image closely connected with these download processing program, From 60000h street to a FFFFFh address is a non-downloading processing program field (with a program required in order that relation with a download processing program may realize various kinds of functions of product original, such as a low font data program). It shall be a program field required in order to realize the event input means 111.

[0025] If remote control is pushed and an operator performs download directions of a program, the event input means 111 will detect a program download demand, and will perform an activate request to the download starting means 110. Next, a download starting means 110 usually makes the condition that a condition maintenance means 108 holds the condition 1 under download processing, from the condition at the time, a status-management means 109 makes the old download processing program stored in a download processing program field at present as shown in the condition 1 of drawing 3 an active download processing program, and the program classification of the program which should download carries out as a download processing program (the program which should download is shown in the inside of a download processing program with the active inside of the thick wire in drawing, and a dotted line).

[0026] A program required in order for this to realize the program storing means 103 and the data receiving means 104 of operating henceforth, and the program acquisition means 105 turns into the old download processing program.

[0027] Next, a download starting means 110 starts a program acquisition means 105, and the program classification which the memory secured means 114 is started since work-piece memory runs short, the memory secured means 114 secures work-piece memory from program memory 113, and the program acquisition means 105 extracts a program packet out of a data packet using the data receiving means 104, and is shown to the (a) of drawing 2 in a program acquisition means 105 reads the program packet of a download processing program to program memory 113. Since the program packet which received is a patch command, the download starting means 110 starts the patch command control means 112. Next, the patch command control means 112 The download processing program stored in the download processing program field based on the address information in a program packet and size information is read into program memory 113. Interpret a patch command and partial rewriting of a download processing program is performed on program memory 113. The program storing means 103 is started. The address information in a program packet, The program body against which the patch was hit based on size information and offset information is stored in the non-downloading processing program field of a flash ROM 101. The condition that the condition maintenance means 108 holds is made into the condition 2 under download processing. The status management means 109 is made into the condition that there are not an active download processing program and a program which should be downloaded as shown in the condition 2 of drawing 6 (the new download processing program which offset was added and was stored in the non-downloading processing

program field). since it is arranged to a different field from the address which should be arranged essentially, it cannot be made to operate the way things stand Since the system initialization means 115 initializes a system; it reboots, and since it is in the condition after reboot and under download processing, the download starting means 110 is started.

[0028] Since the download starting means 110 does not have the program which should be downloaded, the program transfer means 106 is started. Next, the program transfer means 106 The new download processing program stored in the non-downloading processing program field is transmitted to a download processing program field. As the condition that the condition maintenance means 108 holds is made into the condition 3 under download processing and the status management means 109 is shown in the condition 3 of drawing 3 Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program. A program required in order for this to realize the program storing means 103 and the data receiving means 104 of operating henceforth, and the program acquisition means 105 turns into a new download processing program.

[0029] Next, the download starting means 110 starts the program acquisition means 105, the program acquisition means 105 extracts a program packet out of a data packet using the data receiving means 104, and the program classification shown in (c) of drawing 2 reads the program packet of a non-downloading processing program into the work-piece memory 102. Next, the download starting means 110 starts the program storing means 103, stores the program body in the non-downloading processing program field of a flash ROM 101 based on the address information in a program packet, and size information, and usually makes the condition that the condition maintenance means 108 holds the condition at the time.

[0030] The processing flow of the download starting means 110 in the gestalt 1 of the operation which operates as mentioned above is explained below.

[0031] (1) It is started from an event input means 111 by which the program download demand was detected.

[0032] (2) Although it usually generates by external events, such as directions from an operator, generate a program download demand at the time of system startup processing at the time of failure generating under download processing. When it generates by the external event, the condition under download processing is made into a condition 1.

[0033] (3) If the condition under download processing is in a condition 1, it is in a condition 2 in (4) and it is in a condition 3 in (9) (11).

[0034] (4) Make into an active download processing program the old download processing program stored in the download processing program field, and let program classification of the program which should download be a download processing program.

[0035] (5) The memory secured means 114 secures work-piece memory from program memory 113.

[0036] (6) Extract a program packet out of the data packet which received, and program classification reads the program packet of a download processing program into program memory 113.

[0037] (7) the download processing program stored in the download processing program field based on the address information in a program packet and size information is read into program memory 113, a patch command is interpreted, and a download processing program is partial -- rewriting (patch) -- carrying out -- the non-downloading processing program field of a flash ROM 101 -- storing -- the condition under download processing -- a condition 2 -- ** -- carry out.

[0038] (8) The system initialization means 515 reboots a receiving system. After reboot (3),

[0039] (9) Consider as the condition that there are not an active download processing program and a program which should be downloaded.

[0040] (10) Transmit the new download processing program stored in the non-downloading processing program field to a download processing program field, and make the condition under download processing into a condition 3 (3).

[0041] (11) Make into an active download processing program the new download processing

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program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program.

[0042] (12) Extract a program packet out of the data packet which received, and program classification reads the program packet of a non-downloading processing program into the work-piece memory 102.

[0043] (13) Store the program body in the non-downloading processing program field of a flash ROM 101 based on the address information in a program packet, and size information, and cancel the condition under download processing.

[0044] In remote program download equipment [in / as mentioned above / the gestalt 1 of operation of this invention] (End) When the download starting means 110 is in a condition 1, start the old download processing program and the patch command of a download processing program is read. The patch command-control means 112 interprets a patch command, and the new download processing program which created by performing partial rewriting of a download processing program is stored in a non-downloading processing program field. The new download processing program which was stored to the non-downloading processing program field in the case of the condition 2 is transmitted to a download processing program field. By starting a new download processing program in the case of a condition 3, and downloading a non-downloading processing program. Also when a failure occurs during download, the download starting means 110 becomes possible [performing download processing in the condition at the time of failure generating using the active download processing program]. And it becomes possible to be able to change difference by download of only a patch command, without downloading all new download processing programs. By performing download processing, when the memory secured means 114 furthermore secures program memory 113 to work-piece memory, it becomes possible to download, even if work-piece memory runs short.

[0045] In addition, in the gestalt 1 of operation, although initialization which a system initialization means performs was considered as reboot, a receiving system can also be performed by changing into a standby condition once. Moreover, although it opted for the field management on a flash ROM statically, the address information, size information, and offset information in a program packet may determine it dynamically.

[0046] (Gestalt 2 of operation) Below, the gestalt of implementation of invention indicated by claim 3 and claim 4 of this invention is explained using drawing 4 , drawing 2 , and drawing 3 .

[0047] Drawing 4 is the block diagram of the equipment in the gestalt 2 of operation of this invention. In drawing 4 a flash ROM and 402 401 Work-piece memory, such as DRAM, A program storing means to store 403 in a flash ROM 401 in the format that a program can be performed, A data receiving means to receive the data packet to which 404 is transmitted from the transmitter of a transmitting-side system through a digital transmission way, A program acquisition means to read the program management information and the program bodies of the program which 405 interpreted this data packet and had the specified program classification, such as arrangement address information and size information, into the work-piece memory 402, A program transfer means by which 406 transmits a program based on program management information, A condition maintenance means for 407 to use EEPROM, and for 408 to use EEPROM 407, and to hold the condition under download processing of a program, Or [that 409 activates which download processing program in two or more download processing programs for realizing the program storing means 403 required for download processing, the data receiving means 404, and the program acquisition means 405 of a program], It manages which program classification a program with is downloaded in the three condition under download processing which the condition maintenance means 408 holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means 403 required for download processing, the data receiving means 404, and the program acquisition means 405 of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading processing program, 410 makes the condition that the condition maintenance means 408 holds the 1st condition under download

JP, 2000-047677, A [DETAILED DESCRIPTION]

processing, at the time of activate request reception. The program acquisition means realized with a download-processing program when there is a program which the status management means 409 specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into the work-piece memory 402. Start the program storing means 403, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means 406 and was downloaded last time. In the case of the 1st condition, in the case of the 2nd condition and the 2nd condition, it shifts to the 3rd condition. A download starting means to complete the condition under download processing after storing processing ending in the 3rd condition, 411 detects the program download demand from an operator through input devices, such as remote control. An event input means to perform an activate request to the download starting means 410. When the data packet which the data receiving means 404 received is a data packet for patch commands, 412 A patch command control means to interpret this patch command and to perform partial rewriting control of a program. A frame buffer required in order to display 413 on a display monitor, a memory diversion means by which 414 diverts a frame buffer 413 to work-piece memory, and 415 are system initialization means to initialize a receiving system. Although the means which carries out exclusion of the contention of the various resources at the time of performing download processing is required during system operation in fact besides this, since it is not the chief aim of this invention, it omits.

[0048] About the equipment of the gestalt 1 of the operation constituted as mentioned above, the actuation is explained below. Drawing 2 is the explanatory view showing the example of data packet structure which flows a digital transmission way in case the remote program download equipment in the gestalt 2 of operation of this invention downloads a program, and drawing 3 is the explanatory view showing the allocation situation of the flash ROM 401 (capacity of 1 M byte) in each condition under download in case the remote program download equipment in the gestalt 2 of operation of this invention downloads a program.

[0049] As shown in drawing 3, for from 0h street to a FFFFh address, a flash ROM 401 is a boot processing program field (with the program which performs various kinds of initialization processings). A program field required in order to realize the download starting means 410, the condition maintenance means 408, and the status management means 409, From 10000h street to 5FFFFh addresses are download processing program fields (with a program required in order to realize the program storing means 403, the data receiving means 404, and the program acquisition means 405). A program field required in order to realize various kinds of functions of product original, such as a reception program of the digital image closely connected with these download processing program, From 60000h street to a FFFFFh address is a non-downloading processing program field (with a program required in order that relation with a download processing program may realize various kinds of functions of product original, such as a low font data program). It shall be a program field required in order to realize the event input means 411.

[0050] If remote control is pushed and an operator performs download directions of a program, the event input means 411 will detect a program download demand, and will perform an activate request to the download starting means 410. Next, a download starting means 410 usually makes the condition that a condition maintenance means 408 holds the condition 1 under download processing, from the condition at the time, a status-management means 409 makes the old download processing program stored in a download processing program field at present as shown in the condition 1 of drawing 3 an active download processing program, and the program classification of the program which should download carries out as a download processing program (the program which should download is shown in the inside of a download processing program with the active inside of the thick wire in drawing, and a dotted line).

[0051] A program required in order for this to realize the program storing means 403 and the data receiving means 404 of operating henceforth, and the program acquisition means 405 turns into the old download processing program.

[0052] Next, a download starting means 410 starts a program acquisition means 405, and the program classification which the memory diversion means 414 is started since work-piece memory runs short, the memory diversion means 414 secures work-piece memory from a frame

buffer 413, and the program acquisition means 405 extracts a program packet out of a data packet using the data receiving means 404, and is shown to the (a) of drawing 2 in a program acquisition means 405 reads the program packet of a download processing program to a frame buffer 413. Since the program packet which received is a patch command, the download starting means 410 starts the patch command control means 412. Next, the patch command control means 412 The download processing program stored in the download processing program field based on the address information in a program packet and size information is read into program memory 413. Interpret a patch command and partial rewriting of a download processing program is performed on a frame buffer 413. The program storing means 403 is started. The address information in a program packet, The program body against which the patch was hit based on size information and offset information is stored in the non-downloading processing program field of a flash ROM 401. The condition that the condition maintenance means 408 holds is made into the condition 2 under download processing, and the status management means 409 is made into the condition that there are not an active download processing program and a program which should be downloaded as shown in the condition 2 of drawing 6.

[0053] (The new download processing program which offset was added and was stored in the non-downloading processing program field) since it is arranged to a different field from the address which should be arranged essentially, it cannot be made to operate the way things stand. Since the download starting means 410 next does not have the program which should be downloaded, the program transfer means 406 is started. The program transfer means 406 The new download processing program stored in the non-downloading processing program field is transmitted to a download processing program field. As the condition that the condition maintenance means 408 holds is made into the condition 3 under download processing and the status management means 409 is shown in the condition 3 of drawing 3 Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program. A program required in order for this to realize the program storing means 403 and the data receiving means 404 of operating henceforth, and the program acquisition means 405 turns into a new download processing program.

[0054] Next, the download starting means 410 starts the program acquisition means 405, the program acquisition means 405 extracts a program packet out of a data packet using the data receiving means 404, and the program classification shown in (c) of drawing 2 reads the program packet of a non-downloading processing program into the work-piece memory 402.

[0055] Next, the download starting means 410 starts the program storing means 403, stores the program body in the non-downloading processing program field of a flash ROM 401 based on the address information in a program packet, and size information, and usually makes the condition that the condition maintenance means 408 holds the condition at the time.

[0056] The processing flow of the download starting means 410 in the gestalt 1 of the operation which operates as mentioned above is explained below.

[0057] (1) It is started from an event input means 411 by which the program download demand was detected.

[0058] (2) Although it usually generates by external events, such as directions from an operator, generate a program download demand at the time of system startup processing at the time of failure generating under download processing. When it generates by the external event, the condition under download processing is made into a condition 1.

[0059] (3) If the condition under download processing is in a condition 1, it is in a condition 2 in (4) and it is in a condition 3 in (8) (10).

[0060] (4) Make into an active download processing program the old download processing program stored in the download processing program field, and let program classification of the program which should download be a download processing program.

[0061] (5) The memory diversion means 414 secures work-piece memory from a frame buffer 413.

[0062] (6) Extract a program packet out of the data packet which received, and program classification reads the program packet of a download processing program into a frame buffer

[0063] (7) the download processing program stored in the download processing program field based on the address information in a program packet and size information is read into a frame buffer 113, a patch command is interpreted, and a download processing program is partial -- rewriting (patch) -- carrying out -- the non-downloading processing program field of a flash ROM 401 -- storing -- the condition under download processing -- a condition 2 -- carrying out -- (3).

[0064] (8) Consider as the condition that there are not an active download processing program and a program which should be downloaded.

[0065] (9) Transmit the new download processing program stored in the non-downloading processing program field to a download processing program field, and make the condition under download processing into a condition 3 (3).

[0066] (10) Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program.

[0067] (11) Extract a program packet out of the data packet which received, and program classification reads the program packet of a non-downloading processing program into the work-piece memory 402.

[0068] (12) Store the program body in the non-downloading processing program field of a flash ROM 401 based on the address information in a program packet, and size information, and cancel the condition under download processing.

[0069] In remote program download equipment [in / as mentioned above / the gestalt 2 of operation of this invention] (End) When the download starting means 410 is in a condition 1, start the old download processing program and the patch command of a download processing program is read. The patch command control means 412 interprets a patch command, and the new download processing program which created by performing partial rewriting of a download processing program is stored in a non-downloading processing program field. The new download processing program which was stored to the non-downloading processing program field in the case of the condition 2 is transmitted to a download processing program field. By starting a new download processing program in the case of a condition 3, and downloading a non-downloading processing program Also when a failure occurs during download, the download starting means 410 becomes possible [performing download processing in the condition at the time of failure generating using the active download processing program]. And it becomes possible to be able to change difference by download of only a patch command, without downloading all new download processing programs. Furthermore, the memory diversion means 414 becomes possible [downloading, also when a lot of work-piece memory is required] by performing download processing by securing a frame buffer 413 to work-piece memory.

[0070] In addition, it sets in the gestalt 2 of operation, and to a download processing program, a patch command may be made to download a non-downloading processing program by the patch command, although. Moreover, although an operator shall push remote control and shall perform it, the directions from a transmitting-side system may be made to perform directions of a download demand automatically.

[0071] (Gestalt 3 of operation) Below, the gestalt of implementation of invention indicated by claim 5 and claim 6 of this invention is explained using drawing 5, drawing 2, and drawing 3.

[0072] Drawing 5 is the block diagram of the equipment in the gestalt 3 of operation of this invention. In drawing 5 a flash ROM and 502 501 Work-piece memory, such as DRAM, A program storing means to store 503 in a flash ROM 501 in the format that a program can be performed, A data receiving means to receive the data packet to which 504 is transmitted from the transmitter of a transmitting-side system through a digital transmission way, A program acquisition means to read the program management information and the program bodies of the program which 505 interpreted this data packet and had the specified program classification, such as arrangement address information and size information, into the work-piece memory 502, A program transfer means by which 506 transmits a program based on program management information, A condition maintenance means for 507 to use EEPROM, and for 508 to use

EEPROM507, and to hold the condition under download processing of a program, Or [that 509 activates which download processing program in two or more download processing programs for realizing the program storing means 503 required for download processing, the data receiving means 504, and the program acquisition means 505 of a program]. It manages which program classification a program with is downloaded in the three condition under download processing which the condition maintenance means 508 holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means 503 required for download processing, the data receiving means 504, and the program acquisition means 505 of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading-processing program, 510 makes the condition that the condition maintenance means 508 holds the 1st condition under download processing, at the time of activate request reception. The program acquisition means realized with a download processing program when there is a program which the status management means 509 specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into the work-piece memory 502. Start the program storing means 503, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means 506 and was downloaded last time In the case of the 1st condition, in the case of the 2nd condition and the 2nd condition, it shifts to the 3rd condition. A download starting means to complete the condition under download processing after storing processing ending in the 3rd condition, 511 detects the program download demand from an operator through input devices, such as remote control. An event input means to perform an activate request to the download starting means 510, When the data packet which the data receiving means 504 received is a data packet for patch commands, 512 A patch command control means to interpret this patch command and to perform partial rewriting control of a program, A memory management means to secure work-piece memory from the variable region in program memory 513 when the program memory which needs 513 for actuation of a program, and 514 are in a work-piece condition out of memory at the time of system initialization, 515 is a system initialization means to initialize a receiving system. Although the means which carries out exclusion of the contention of the various resources at the time of performing download processing is required during system operation in fact besides this, since it is not the chief aim of this invention, it omits.

[0073] About the equipment of the gestalt 3 of the operation constituted as mentioned above, the actuation is explained below. Drawing 2 is the explanatory view showing the example of data packet structure which flows a digital transmission way in case the remote program download equipment in the gestalt 3 of operation of this invention downloads a program, and drawing 3 is the explanatory view showing the allocation situation of the flash ROM 501 (capacity of 1 M byte) in each condition under download in case the remote program download equipment in the gestalt 3 of operation of this invention downloads a program.

[0074] As shown in drawing 3 , for from 0h street to a FFFFh address, a flash ROM 501 is a boot processing program field (with the program which performs various kinds of initialization processings). A program field required in order to realize the download starting means 510, the condition maintenance means 508, and the status management means 509, From 50000h street to 5FFFFh addresses are download processing program fields (with a program required in order to realize the program storing means 503, the data receiving means 504, and the program acquisition means 505). A program field required in order to realize various kinds of functions of product original, such as a reception program of the digital image closely connected with these download processing program, From 60000h street to a FFFFFh address is a non-downloading processing program field (with a program required in order that relation with a download processing program may realize various kinds of functions of product original, such as a low font data program). It shall be a program field required in order to realize the event input means 511.

[0075] If remote control is pushed and an operator performs download directions of a program, the event input means 511 will detect a program download demand, and will perform an activate

request to the download starting means 510. Next, a download starting means 510 usually makes the condition that a condition maintenance means 508 holds the condition 1 under download processing, from the condition at the time, a status-management means 509 makes the old download processing program stored in a download processing program field at present as shown in the condition 1 of drawing 3 an active download processing program, and the program classification of the program which should download carries out as a download processing program (the program which should download is shown in the inside of a download processing program with the active inside of the thick wire in drawing, and a dotted line).

[0076] A program required in order for this to realize the program storing means 503 and the data receiving means 504 of operating henceforth, and the program acquisition means 505 turns into the old download processing program.

[0077] Next, the download starting means 510 starts the program acquisition means 505. Since the program acquisition means 505 runs short of work-piece memory, the system initialization means 515 is started. Since it reboots since the system initialization means 515 initializes a system, and it is in the condition after reboot and under download processing, The download starting means 510 is started and the download starting means 510 starts the memory management means 514. The memory management means 514 secures work-piece memory from the usable field in program memory 513. The program acquisition means 505 extracts a program packet out of a data packet using the data receiving means 504, and the program classification shown in (a) of drawing 2 reads the program packet of a download processing program into program memory 513.

[0078] Since the program packet which received is a patch command, the download starting means 510 starts the patch command control means 512. Next, the patch command control means 512 The download processing program stored in the download processing program field based on the address information in a program packet and size information is read into program memory 513. Interpret a patch command and partial rewriting of a download processing program is performed on program memory 513. The program storing means 503 is started. The address information in a program packet, The program body against which the patch was hit based on size information and offset information is stored in the non-downloading processing program field of a flash ROM 501. The condition that the condition maintenance means 508 holds is made into the condition 2 under download processing. The status management means 509 is made into the condition that there are not an active download processing program and a program which should be downloaded as shown in the condition 2 of drawing 6 (the new download processing program which offset was added and was stored in the non-downloading processing program field). since it is arranged to a different field from the address which should be arranged essentially, it cannot be made to operate the way things stand Since the system initialization means 515 initializes a system, it reboots, and since it is in the condition after reboot and under download processing, the download starting means 510 is started.

[0079] Since the download starting means 510 does not have the program which should be downloaded, the program transfer means 506 is started. Next, the program transfer means 506 The new download processing program stored in the non-downloading processing program field is transmitted to a download processing program field. As the condition that the condition maintenance means 508 holds is made into the condition 3 under download processing and the status management means 509 is shown in the condition 3 of drawing 3 Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program. A program required in order for this to realize the program storing means 503 and the data receiving means 504 of operating henceforth, and the program acquisition means 505 turns into a new download processing program.

[0080] Next, the download starting means 510 starts the program acquisition means 505, the program acquisition means 505 extracts a program packet out of a data packet using the data receiving means 504, and the program classification shown in (c) of drawing 2 reads the program packet of a non-downloading processing program into the work-piece memory 502.

[0081] Next, the download starting means 510 starts the program storing means 503, stores the

program body in the non-downloading processing program field of a flash ROM 501 based on the address information in a program packet, and size information, and usually makes the condition that the condition maintenance means 508 holds the condition at the time.

[0082] The processing flow of the download starting means 510 in the gestalt 1 of the operation which operates as mentioned above is explained below.

[0083] (1) It is started from an event input means 511 by which the program download demand was detected.

[0084] (2) Although it usually generates by external events, such as directions from an operator, generate a program download demand at the time of system startup processing at the time of failure generating under download processing. When it generates by the external event, the condition under download processing is made into a condition 1.

[0085] (3) If the condition under download processing is in a condition 1, it is in a condition 2 in (4) and it is in a condition 3 in (8) (10).

[0086] (4) Make into an active download processing program the old download processing program stored in the download processing program field, and let program classification of the program which should download be a download processing program.

[0087] (5) The system initialization means 515 reboots a receiving system. The memory management means 514 secures work-piece memory from program memory 513 after reboot (3).

[0088] (6) Extract a program packet out of the data packet which received, and program classification reads the program packet of a download processing program into program memory 513.

[0089] (7) the download processing program stored in the download processing program field based on the address information in a program packet and size information is read into program memory 513, a patch command is interpreted, and a download processing program is partial — rewriting (patch) — carrying out — the non-downloading processing program field of a flash ROM 501 — storing — the condition under download processing — a condition 2 — carrying out — (3).

[0090] (8) Consider as the condition that there are not an active download processing program and a program which should be downloaded.

[0091] (9) Transmit the new download processing program stored in the non-downloading processing program field to a download processing program field, and make the condition under download processing into a condition 3 (3).

[0092] (10) Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program.

[0093] (11) Extract a program packet out of the data packet which received, and program classification reads the program packet of a non-downloading processing program into the work-piece memory 502.

[0094] (12) Store the program body in the non-downloading processing program field of a flash ROM 501 based on the address information in a program packet, and size information, and cancel the condition under download processing.

[0095] In remote program download equipment [in / as mentioned above / the gestalt 3 of operation of this invention] (End) When the download starting means 510 is in a condition 1, start the old download processing program and the patch command of a download processing program is read. The patch command control means 512 interprets a patch command, and the new download processing program which created by performing partial rewriting of a download processing program is stored in a non-downloading processing program field. The new download processing program which was stored to the non-downloading processing program field in the case of the condition 2 is transmitted to a download processing program field. By starting a new download processing program in the case of a condition 3, and downloading a non-downloading processing program Also when a failure occurs during download, the download starting means 510 becomes possible [performing download processing in the condition at the time of failure generating using the active download processing program]. And it becomes possible to be able

to change difference by download of only a patch command, without downloading all new download processing programs. By securing work-piece memory from the variable region in program memory 513, when the memory management means 514 is furthermore in a work-piece condition out of memory at the time of system initialization It becomes possible to download, even if it moreover cannot use a frame buffer etc. by the case where a lot of work-piece memory is required.

[0096] In addition, in the gestalt 3 of operation, although the buffer used for rewriting of the reading buffer program of a program packet shall use work-piece memory, generally the reading buffer of a program packet is small, and since the buffer used for rewriting of a program is large, it can also use the work-piece memory 502 for the former.

[0097] (Gestalt 4 of operation) Below, the gestalt of implementation of invention indicated by claim 7 and claim 8 of this invention is explained using drawing 6, drawing 2, and drawing 3.

[0098] Drawing 6 is the block diagram of the equipment in the gestalt 4 of operation of this invention. In drawing 6 a flash ROM and 602 601 Work-piece memory, such as DRAM, A program storing means to store 603 in a flash ROM 601 in the format that a program can be performed, A data receiving means to receive the data packet to which 604 is transmitted from the transmitter of a transmitting-side system through a digital transmission way, A program acquisition means to read the program management information and the program bodies of the program which 605 interpreted this data packet and had the specified program classification, such as arrangement address information and size information, into the work-piece memory 602, A program transfer means by which 606 transmits a program based on program management information, A condition maintenance means for 607 to use EEPROM, and for 608 to use EEPROM 607, and to hold the condition under download processing of a program, Or [that 609 activates which download processing program in two or more download processing programs for realizing the program storing means 603 required for download processing, the data receiving means 604, and the program acquisition means 605 of a program], It manages which program classification a program with is downloaded in the three condition under download processing which the condition maintenance means 608 holds. In the case of the 1st condition Program classification of the program to download is made into the download processing program for realizing the program storing means 503 required for download processing, the data receiving means 604, and the program acquisition means 605 of a program. In the case of the 2nd condition, make it into the condition that there is no program which should be downloaded, and when it is in the 3rd condition The status management means which makes program classification of the program to download a non-downloading processing program, 610 makes the condition that the condition maintenance means 608 holds the 1st condition under download processing, at the time of activate request reception. The program acquisition means realized with a download processing program when there is a program which the status management means 609 specified, and which should be downloaded is started. A program with the program classification of the program which should be downloaded is read into the work-piece memory 602. Start the program storing means 603, store this program, and when there is no program which should download, after transmitting the program which started the program transfer means 606 and was downloaded last time In the case of the 1st condition, in the case of the 2nd condition and the 2nd condition, it shifts to the 3rd condition. A download starting means to complete the condition under download processing after storing processing ending in the 3rd condition, 611 detects the program download demand from an operator through input devices, such as remote control. An event input means to perform an activate request to the download starting means 610, When the data packet which the data receiving means 604 received is a data packet for patch commands, 612 A patch command control means to interpret this patch command and to perform partial rewriting control of a program, A memory management means to secure work-piece memory from the variable region in program memory 613 when the program memory which needs 613 for actuation of a program, and 614 are in a work-piece condition out of memory at the time of system initialization, When delay run designation has a system initialization means by which 615 initializes a receiving system, and the patch command which 616 received A patch command is stored in nonvolatile memory, the condition maintenance

means 608 is started, and it considers as a patch command delay running state, and is a delay activation means to start a patch command control means at the time of system initialization when it is a delay running state. Although the means which carries out exclusion of the contention of the various resources at the time of performing download processing is required during system operation in fact besides this, since it is not the chief aim of this invention, it omits.

[0099] About the equipment of the gestalt 4 of the operation constituted as mentioned above, the actuation is explained below. Drawing 2 is the explanatory view showing the example of data packet structure which flows a digital transmission way in case the remote program download equipment in the gestalt 4 of operation of this invention downloads a program, and drawing 3 is the explanatory view showing the allocation situation of the flash ROM 601 (capacity of 1 M byte) in each condition under download in case the remote program download equipment in the gestalt 4 of operation of this invention downloads a program.

[0100] As shown in drawing 3, for from 0h street to a FFFFh address, a flash ROM 601 is a boot processing program field (with the program which performs various kinds of initialization processings). A program field required in order to realize the download starting means 610, the condition maintenance means 608, and the status management means 609, From 60000h street to 5FFFFh addresses are download processing program fields (with a program required in order to realize the program storing means 603, the data receiving means 604, and the program acquisition means 605). A program field required in order to realize various kinds of functions of product original, such as a reception program of the digital image closely connected with these download processing program, From 60000h street to a FFFFFh address is a non-downloading processing program field (with a program required in order that relation with a download processing program may realize various kinds of functions of product original, such as a low font data program). It shall be a program field required in order to realize the event input means 611.

[0101] If remote control is pushed and an operator performs download directions of a program, the event input means 611 will detect a program download demand, and will perform an activate request to the download starting means 610. Next, a download starting means 610 usually makes the condition that a condition maintenance means 608 holds the condition 1 under download processing, from the condition at the time, a status-management means 609 makes the old download processing program stored in a download processing program field at present as shown in the condition 1 of drawing 3 an active download processing program, and the program classification of the program which should download carries out as a download processing program (the program which should download is shown in the inside of a download processing program with the active inside of the thick wire in drawing, and a dotted line).

[0102] A program required in order for this to realize the program storing means 603 and the data receiving means 604 of operating henceforth, and the program acquisition means 605 turns into the old download processing program.

[0103] Next, the download starting means 610 starts the program acquisition means 605, the program acquisition means 605 extracts a program packet out of a data packet using the data receiving means 604, and the program classification shown in (a) of drawing 2 reads the program packet of a download processing program into the work-piece memory 602.

[0104] Next, since the program packet which received is a patch command, the download starting means 610 starts the patch command control means 612, since the received patch command is delay run designation, the patch command control means 612 stores a patch command in EEPROM607, and after starting the condition maintenance means 608 and considering as a patch command delay running state, a receiving system usually processes.

[0105] Next, if a power source is again turned on after an operator pushes remote control and turns off the power source of a receiving system Since it is in the condition under download processing, the download starting means 610 is started. Since the download starting means 610 starts the memory management means 614, secures work-piece memory from the usable field in program memory 613 and is a patch command delay running state, Start the patch command control means 612, and patch command control means 612 interpret a patch command, and perform partial rewriting of a download processing program on program memory 613. The

program storing means 603 is started. The address information in a program packet, The program body against which the patch was hit based on size information and offset information is stored in the non-downloading processing program field of a flash ROM 601. The condition that the condition maintenance means 608 holds is made into the condition 2 under download processing. The status management means 609 is made into the condition that there are not an active download processing program and a program which should be downloaded as shown in the condition 2 of drawing 6 (the new download processing program which offset was added and was stored in the non-downloading processing program field). since it is arranged to a different field from the address which should be arranged essentially, it cannot be made to operate the way things stand Since the system initialization means 615 initializes a system, it reboots, and since it is in the condition after reboot and under download processing, the download starting means 610 is started.

[0106] Since the download starting means 610 does not have the program which should be downloaded, the program transfer means 606 is started. Next, the program transfer means 606 The new download processing program stored in the non-downloading processing program field is transmitted to a download processing program field. As the condition that the condition maintenance means 608 holds is made into the condition 3 under download processing and the status management means 609 is shown in the condition 3 of drawing 3 Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program. A program required in order for this to realize the program storing means 603 and the data receiving means 604 of operating henceforth, and the program acquisition means 605 turns into a new download processing program.

[0107] Next, the download starting means 610 starts the program acquisition means 605, the program acquisition means 605 extracts a program packet out of a data packet using the data receiving means 604, and the program classification shown in (c) of drawing 2 reads the program packet of a non-downloading processing program into the work-piece memory 602. Next, the download starting means 610 starts the program storing means 603, stores the program body in the non-downloading processing program field of a flash ROM 601 based on the address information in a program packet, and size information, and usually makes the condition that the condition maintenance means 608 holds the condition at the time.

[0108] The processing flow of the download starting means 610 in the gestalt 4 of the operation which operates as mentioned above is explained below.

[0109] (1) It is started from an event input means 611 by which the program download demand was detected.

[0110] (2) Although it usually generates by external events, such as directions from an operator, generate a program download demand at the time of system startup processing at the time of failure generating under download processing. When it generates by the external event, the condition under download processing is made into a condition 1.

[0111] (3) If the condition under download processing is in a condition 1, it is in a condition 2 in (4) and it is in a condition 3 in (8) (10).

[0112] (4) Make into an active download processing program the old download processing program stored in the download processing program field, and let program classification of the program which should download be a download processing program.

[0113] (5) Extract a program packet out of the data packet which received, and program classification reads the program packet of a download processing program into the work-piece memory 602.

[0114] (6) Since the received patch command is delay run designation, after storing a patch command in EEPROM607 and considering as a ** patch command delay running state, a receiving system usually continues processing.

[0115] (7) the download processing program stored in the download processing program field based on the address information after a power-source reclosing and in a program packet and size information is read into program memory 613, a patch command is interpreted, and a download processing program is partial -- rewriting (patch) -- carrying out -- the non-

downloading processing program field of a flash ROM 601 -- storing -- the condition under download processing -- a condition 2 -- carrying out -- (3).

[0116] (8) Consider as the condition that there are not an active download processing program and a program which should be downloaded.

[0117] (9) Transmit the new download processing program stored in the non-downloading processing program field to a download processing program field, and make the condition under download processing into a condition 3 (3).

[0118] (10) Make into an active download processing program the new download processing program transmitted to the download processing program field, and let program classification of the program which should download be a non-downloading processing program.

[0119] (11) Extract a program packet out of the data packet which received, and program classification reads the program-packet of a non-downloading-processing-program into the work-piece memory 602.

[0120] (12) Store the program body in the non-downloading processing program field of a flash ROM 601 based on the address information in a program packet, and size information, and cancel the condition under download processing.

[0121] In remote program download equipment [in / as mentioned above / the gestalt 3 of operation of this invention] (End) When the download starting means 610 is in a condition 1, start the old download processing program and the patch command of a download processing program is read. The patch command control means 612 interprets a patch command, and the new download processing program which created by performing partial rewriting of a download processing program is stored in a non-downloading processing program field. The new download processing program which was stored to the non-downloading processing program field in the case of the condition 2 is transmitted to a download processing program field. By starting a new download processing program in the case of a condition 3, and downloading a non-downloading processing program Also when a failure occurs during download, the download starting means 610 becomes possible [performing download processing in the condition at the time of failure generating using the active download processing program]. And it becomes possible to be able to change difference by download of only a patch command, without downloading all new download processing programs. By securing work-piece memory from the variable region in program memory 613, when the memory management means 614 is furthermore in a work-piece condition out of memory at the time of system initialization It becomes possible to download, even if it moreover cannot use a frame buffer etc. by the case where a lot of work-piece memory is required. And it makes it possible to perform download processing, without the delay activation means 616 rebooting activation of a patch command during receiving-system operation by being delayed until after a power-source reclosing.

[0122]

[Effect of the Invention] In the remote program download equipment of this invention A download ** download starting means starts the active download processing program which a status management means specifies. By downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download, it becomes possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. And since a non-downloading processing program field without the need of operating is utilized during download in this case and he is trying to place a download processing program, A download processing field is not needed too much [sake / when the program field for download processing is destroyed]. It is not necessary to newly develop the program only for downloads and to transmit. Difference can be changed by download of only a patch command, without downloading all the programs to download. By being able to reduce the amount of the program to download, and performing download processing, when a memory secured means secures program memory further to work-piece memory Since it is downloadable even if it does not have the excessive volatile memory for download, the practical effectiveness is large.

[0123] Moreover, it sets to the remote program download equipment of this invention. A

download ** download starting means starts the active download processing program which a status management means specifies. By downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download, it becomes possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field. And since a non-downloading processing program field without the need of operating is utilized during download in this case and he is trying to place a download processing program, A download processing field is not needed too much [sake / when the program field for download processing is destroyed]. It is not necessary to newly develop the program only for downloads and to transmit. Difference can be changed by download of only a patch command, without downloading all the programs to download. By being able to reduce the amount of the program to download, and performing download processing, when a memory diversion means secures a frame buffer further to work-piece memory Since it can download without having excessive volatile memory even if it is the case which needs a lot of work-piece memory for download, the practical effectiveness is large.

[0124] Moreover, it sets to the remote program download equipment of this invention. A download ** download starting means starts the active download processing program which a status management means specifies. By downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download, it becomes possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field.

[0125] And since a non-downloading processing program field without the need of operating is utilized during download in this case and he is trying to place a download processing program, A download processing field is not needed too much [sake / when the program field for download processing is destroyed]. It is not necessary to newly develop the program only for downloads and to transmit. Difference can be changed by download of only a patch command, without downloading all the programs to download. By the amount of the program to download being reducible, and securing work-piece memory from the variable region in program memory, when a memory management means is in a work-piece condition out of memory further at the time of system initialization Even if it moreover cannot use a frame buffer etc. by the case where a lot of work-piece memory is required for download, since it can download without having excessive volatile memory, the practical effectiveness is large.

[0126] Moreover, it sets to the remote program download equipment of this invention. A download ** download starting means starts the active download processing program which a status management means specifies. By downloading or transmitting the program which a status management means specifies and which should be downloaded Even if failures, such as power off, occur and a working download processing program field is destroyed during download, it becomes possible to resume download processing by transmitting the download processing program stored in the non-downloading processing program field.

[0127] And since a non-downloading processing program field without the need of operating is utilized during download in this case and he is trying to place a download processing program, A download processing field is not needed too much [sake / when the program field for download processing is destroyed]. It is not necessary to newly develop the program only for downloads and to transmit. Difference can be changed by download of only a patch command, without downloading all the programs to download. By the amount of the program to download being reducible, and securing work-piece memory from the variable region in program memory, when a memory management means is in a work-piece condition out of memory further at the time of system initialization Even if it moreover cannot use a frame buffer etc. by the case where a lot of work-piece memory is required for download It can download without having excessive volatile memory. Moreover, since it can download without rebooting under receiving-system operation becoming unnecessary, and making an operator conscious of download, when the delay activation means 616 is delayed until after a power-source reclosing in activation of a patch command, the practical effectiveness is large.

[Translation done.]